

THURSDAY, NOVEMBER 19, 1891.

SCOTCH FISHERIES.

The Ninth Annual Report of the Fishery Board for Scotland: being for the Year 1890. (Edinburgh: Printed for Her Majesty's Stationery Office by Neil and Co., 1891.)

THIS, like the three preceding Reports, is published in three parts: I. General Report; II. Report on Salmon Fisheries; III. Scientific Investigations.

The first part deals with such matters as the statistics relating to fish landed and cured, Crown brands, number of boats and men fishing, an account of the services rendered by the various vessels employed in marine police and fishery superintendence; and generally, reports on all business matters connected with this section of the Board's work. The Shetland herring fishing seems to have been particularly successful, and to have attracted the usual number of English and Irish boats, but the reports as to the number of Scotch boats employed in this and long-line fishing tend to show that there is a gradual decrease; that the fishing does not now seem to hold out such attractions to the rising generation as it once did; that probably over-competition is telling upon this as well as other industries.

The chief article in the second part is the annual report of Mr. Archibald Young, Inspector of Salmon Fisheries for Scotland. It contains an account of the fishings in the various rivers and lochs, with answers to queries from district boards and local fishing authorities. The question of the advisability of having a close-time for trout is only casually mentioned; and we cannot but think that the Board would do well if, with all the facilities at its command, it paid more careful attention to such matters as the life-history and habits of the salmon. Many points of great interest and usefulness have still to be settled: for instance, we see no attempt to distinguish between the different "runs" of fish in the various rivers, their spawning periods, and subsequent movements. We are not told whether, in the case of the salmon hatcheries, any attention has been paid to the spawning of spring run fish—probably a point of great importance in early rivers. Might the Board not collect and publish much valuable information as to the best means of keeping up a steady supply of Salmonidæ, by looking at the question a little more with the interest of the naturalist and sportsman? A great deal of information is yet required as to late and early spawning, migratory movements of the young, rate of growth in the sea, food, &c. To carry out some of these inquiries might possibly require more legal power than the Board possesses, but that the Fishery Board is in a more favourable position than other fishery authorities will be generally admitted. These excellent reports as to the state of the salmon fishings should be used more as a means for improving that state than as the finished results of a year's inspection.

The third or scientific section of the Report is a volume of nearly 430 pages. The word *scientific* has, with the Fishery Board, a significance of its own: it

covers a multitude of subjects, but is on the whole a convenient title. Part III. is subdivided into four sections. In the first (A.), after detailed tabulated results of the work done by means of the cruiser *Garland*, &c., there are one or two papers deserving of special mention.

A paper by Dr. Fullarton, "On the Suitability of Scottish Waters for Oyster Culture," is an exhaustive account of an expedition made by him to a great number of lochs on the west coast, and shows clearly that some of these lochs formerly produced an abundance of oysters, and have had, within recent years, an abundant fall of spat on their spawning beds. A table of temperatures and densities is also given, which is valuable, but would certainly have been much more so if the temperature readings had been given in the common Fahrenheit instead of the Centigrade scale. The next paper is by the Secretary for Scientific Investigations, Dr. T. Wemyss Fulton, on "The Capture and Destruction of Immature Sea Fish." The two most important parts of this paper deal with the vitality of trawled fish, and the numbers of immature fish taken by shrimpers. It is the first attempt ever made to collect accurate data as to the proportion of living and dead fish brought up in a trawl net worked upon a certain kind of bottom for a certain length of time. The information regarding the number of immature fish taken by shrimpers has been collected in the Solway Firth and on the Lancashire coast. The results cannot but be surprising to very many. Taking the Solway alone, Dr. Fulton's totals show that, in one year, a single boat captures over 110,000 immature plaice. It is gratifying to learn that in this district the fishermen are, for once, provident, and return to the sea all these little fishes, for the sum-total of all immature fish landed in the year, comes to about 3,653,000. Dr. Fulton finds that, owing to the short time the shrimp trawl remains at the bottom—a sandy bottom—none of the young fish die. This contradicts a statement very generally made by those who denounce the system of fishing with beam trawl, and also is exactly the reverse of the finding of MM. Giard and Roussin in their report on this subject to the French Minister of Marine—a report founded, however, not on experimental observation, as Dr. Fulton does not fail to point out. These observations further seem to show that very young fish caught in a shrimp trawl are much more tenacious of life than older fish taken in a large net of similar construction, and under similar conditions. This point, we think, is of some importance, and has not been sufficiently taken notice of. It bears on the question of size of mesh and destruction of small fish taken.

The biological section opens with a long paper, "On the Food of Fishes," by W. Ramsay Smith, B.Sc., and, following this, another paper by Dr. Wemyss Fulton, on "The Comparative Fecundity of Sea Fishes." In this paper the author first deals with the proportional weight of the ova compared to the rest of the body. This naturally leads him into the somewhat complicated subject of the proportion of eggs ripe at the spawning-time of certain fishes which do not shed their spawn *en masse*. He finds that in such cases it would often be an impossibility for the body of the fish to contain all the eggs it naturally produces in an enlarged and ripe condition. Taking

the instance of a plaice, it is shown that, if all its ova were ripe at once, the mass of eggs would themselves weigh a pound and a half heavier than the body of the fish without the ovaries.

Fish with demersal ova are distinguished from fish with pelagic ova, and tables are constructed which show the ratio of the weight of the ova present at one time, to the weight of the rest of the fish taken at 1000. The final results are given in the form of mean ratios. Dr. Fulton then goes on to draw three conclusions from his data. First, he says, it appears "to explain the majority of cases in which the females of a species are in excess of the males." What precisely explains this we are quite at a loss to see, and we cannot imagine an explanation which has not in it either a statement regarding the preponderance of the female element in the early nuclear plasma of the eggs, or an account of a wholesale destruction of males. The second point is the generally greater size of the female, and the third, "not merely the gradual growth of ova to replace mature ova shed during a prolonged spawning period, but the more or less sudden increase of bulk, which occurs in the ovum shortly prior to its extrusion." The second point seems to us to be like the first in requiring a more complete explanation; the third to be the clearest point advanced. The remainder of the paper is taken up with detailed statements, treating the fish according to their classification.

Among the papers following we have examples of Mr. Scott's conscientious systematic work in his second paper on "The Invertebrate Fauna of the Inland Waters of Scotland," and "Additions to the Fauna of the Firth of Forth."

Dr. Fullarton contributes a paper on "The Development of the Plaice—Preliminary Report." There are a number of excellent figures, but as there seems to be little that is new in the text, we do not give it further mention.

Prof. McIntosh adds to his already long list of observations "On the Life-Histories and Development of the Food and other Fishes." Interesting forms, such as a hybrid brill, lesser weaver, and sand-eel, are dealt with, as well as several unknown eggs and a curious unknown post-larval form.

Prof. Prince, so often associated with Prof. McIntosh, follows with "Notes on the Development of the Angler Fish (*Lophius*)."

In his statement that "hitherto no British observer has secured the ova," he has overlooked the fact that, in some previous notes by one of the naturalists to the Fishery Board, the procuring of a mass of ova was recorded. This, of course, in no way detracts from the interest of Prof. Prince's valuable paper.

The biological section closes with a note on "A Case of Hermaphroditism in a Haddock," by W. Ramsay Smith. Both ovary and testis appeared perfectly normal, and were removed from a fish 18 inches long, and 3 pounds in weight.

The physical investigations of the Board are dealt with by Dr. Mill in Section C.; and a review of the contemporary scientific fishery investigations, by Dr. Wemyss Fulton, forming a fourth section, brings the Report to a close.

THE MAMMALS OF INDIA.

Catalogue of Mammalia in the Indian Museum, Calcutta.

By W. L. Sclater, M.A., F.Z.S., Deputy Superintendent of the Indian Museum. Part II. (Calcutta: Printed by order of the Trustees of the Indian Museum, 1891.)

THE Indian Museum at Calcutta is rich in Mammals. Not only are those of our Eastern possessions well illustrated, but it possesses also a good general series from other parts of the world. The collection has, moreover, the advantage of being well catalogued. In 1863, the late very zealous and acute zoologist, Edward Blyth, published a catalogue of the specimens contained in the Museum of the Asiatic Society of Bengal. This Museum, when transferred to the Government of India, formed the nucleus of the present Indian Museum. The 1330 specimens mentioned in that catalogue have now increased to 4872, representing 590 species, of which 276 are found within our Indian Empire, and 314 are exotic.

Of this greatly augmented collection Dr. John Anderson commenced a catalogue, and the first part, containing the orders Primates, Prosimiæ, Chiroptera, and Insectivora, was published in 1881. In consequence of Dr. Anderson's relinquishing his appointment as Superintendent of the Museum, the work has remained in abeyance for some years; but it has now been taken up and completed by Mr. W. L. Sclater, the present Deputy Superintendent, and eldest son of the distinguished Secretary of the Zoological Society of London. This volume contains the orders Rodentia, Ungulata, Proboscidea, Hyracoidea, Carnivora, Cetacea, Sirenia, Marsupialia, and Monotremata.

The Mammals of our Indian Empire have attracted the attention of many well-qualified zoologists. Hodgson, Blyth, Jerdon, Tickell, Horsfall, Elliot, Dobson, Anderson, and others, have contributed much to elucidate their history, habits, and distribution. The work now being published under the auspices of the Indian Government by Mr. W. T. Blanford, the first part of which appeared in 1888 (see NATURE, vol. xxxviii. p. 513), contains a valuable summary of all that is known upon the subject up to the present time. Mr. Sclater's work is of a less ambitious kind, professing to be only a catalogue of the Mammalia contained in the Museum, not mentioning any other species. Such catalogues are not only invaluable for working purposes in the institution itself, but they have also a more extended area of usefulness, being often works of reference which no zoologist investigating the group they treat of can dispense with. In the present case there will be found under the heading of every species much information as to its literature, synonymy, and geographical distribution. As catalogues naturally deal largely with names, the selection of those which accord best with a common-sense interpretation of the rules of zoological nomenclature is a matter of primary importance, and in this respect Mr. Sclater appears to have shown upon the whole great judgment, having been careful to avoid unnecessary alterations in generally accepted names, either such as are caused by splitting genera, or by reviving obsolete, long-forgotten, or never received specific appellations. Although no de-